



PRELIMINARY DAMAGE ASSESSMENT (PDA)  
**FOR FLOOD CONTROL PROJECT**

Honolulu Engineer District  
CEPOH-EC-T

*Pa'auauFCP04\_PDA..doc*

**PRELIMINARY DAMAGE ASSESSMENT**

**PA'AUAU FLOOD CONTROL PROJECT  
ISLAND OF HAWAII, HAWAII**

**19 March 2004**

1. Project Name: The Pa'auau Flood Control Project.

2. Date of Inspection: March 9, 2004

3. Inspection Personnel:

Name	Agency/Office	Telephone No.
a. Lynnette F. Schaper	USACE-POH	438-1298
b. Dan Meyers	USACE-POH	438-8875
c. Steve Takeguchi	USACE-POH	438-1274
d. Ralph Fike	DPW Highway Maintenance	939-2500
e. Gary Tomadong	DPW Highway Maintenance	939-2500

4. CEI Rating:

As a result of the FY03 Continuing Eligibility Inspection conducted on November 19, 2003 the project was rated **SATISFACTORY**. Project Condition Code is **ACCEPTABLE** and the project is considered **ACTIVE** in the Rehabilitation and Inspection Program.

5. Discussion:

This inspection was held due to damage caused by a large rainfall runoff event that occurred in January 2004. The event started at approximately 8pm on January 22, 2004 and lasted 24 hours. The peak rainfall recorded at the NOAA Pahala (HI-85) gage on January 22-23, 2004 was 7.1 inches in 24 hours and 1.79 inches in 1 hour.

The inspection included walking the project from upstream to downstream. The inspection identified 25 areas that need attention. These areas are listed below.



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- a. Sta. 35+00, Toe at top end of project, tie back needs repair



- b. Sta. 34+25 (approx) to 35+00, cleanout boulders and sediment in channel



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c. Sta. 33+80 (approx), 21 LF toe repair below Floodwall A



d. Sta. 32+00 (approx), 14 LF toe repair below Floodwall A



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- e. Sta. 31+00, 36 LF toe repair (top & bottom photos), depth of hole 32 inches (top photo)



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f. Sta. 29+50 (approx), 27 LF toe repair





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g. Sta. 27+50 (approx), 14 LF boulder slope concrete lining toe repair between Floodwalls A & B





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- h. Sta. 26+50 to 27+00 (approx), crack in concrete needs repair (top photo) and 42 LF toe flaking needs repair (top & bottom photos)



- i. Sta. 24+00 (approx), 13 LF toe repair





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- j. Sta. 21+80 (approx), 46 LF CBSL toe failure, between Floodwalls B & C



- k. Sta. 21+00 (approx), toe repair, below Floodwall C





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- l. Sta. 20+40 (approx), 4 LF toe repair



- m. Sta. 18+30 (approx), 35 LF toe repair, between Floodwall C & D





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- n. Sta. 18+00 (approx), 25 LF toe of boulder concrete slope (BCS)



- o. Sta. 17+00 (approx), toe repair at the beginning of BCS, below Floodwall D





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- p. Sta. 16+27 (approx), 40 LF X 12 LF wide need to tie hole into structures



- q. Sta. 16+00 (approx), 6 LF toe repair, downstream end of Floodwall D





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r. Sta. 15+70 (approx), 15 LF toe repair





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- s. Sta. 14+25 (approx), patch hole 34 LF across (top photo), 25 LF toe repair (top and bottom photo), upper end of Floodwall E



- t. Sta. 13+50 (approx), 17 LF toe repair and invert

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- u. Sta. 13+20 (approx), 65 LF toe repair, toe needs to be keyed in



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v. Sta. 12+15 (approx), 97 LF toe repair, verify when dry



w. Sta. 10+50 (approx), 96 LF toe repair, toe needs to be keyed in



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- x. Sta. 8+77 (approx), 56 LF toe repair, address the hole in channel or the toe will fail in the future, hole is 45 LF wide by 56 LF direction of flow by 20 inches deep



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y. Sta. 7+00, 35 LF toe repair, patch hole 5 feet out from toe, downstream end of project

## 6. Findings/Conclusions

The inspection found several areas that need repair. Toe repair is critical in all areas mentioned as a toe failure could allow for an undermining of the bank and possible catastrophic failure to the bank and/or floodwall in the area. The bed is not directly part of the Project, as the Project is on the right bank, but the tie in of the Project at the toe is dependent on the bed (or invert) of the channel.

The bed (or invert) of the channel is not currently covered by the PL84-99, nor was it covered in the initial Flood Control Study. The bed is composed of highly fractured lava rock. There are areas in the project where the bed has vertical drops of 12 feet or more. Due to the nature of the bed's composition, the bed will continue to erode over time. The bed needs to be addressed as the erosion of the bed will directly affect the right bank FCP. There also exists an opportunity to stabilize the bed in the location of the Pa'auau FCP to stop the current headcut. Once this headcut is out of the FCP area, it will move upstream into the watershed, which could cause extensive damage and erosion.

The increased damage to the Pa'auau FCP at lower rainfall events than in years past, is due to changes in land use in the upstream watershed. The local sponsor relayed that when the project was built that a large portion of the watershed was sugarcane fields. The management of the sugarcane fields placed diversions in the upstream channel(s) to convey flows into the fields and/or to irrigation ponds. These irrigation ponds and diversions are no longer maintained



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and/or used. Therefore, an increase in the flows for the more frequent rainfall storm events is occurring. The USACE-Honolulu District in 2000 completed a study on the hydrology change in the FCP area.

It is recommended that a Project Information Report (PIR) be completed for the Pa'auau FCP. The PIR should contain an analysis of a design deficiency addressing why the project only covered one side of the channel. The geology of the area needs to be included in the PIR. The geology is directly affecting how the bed (invert) is responding to the forces of flow upon it. The PIR should also summarize information on the hydrology changes to the watershed from the previous report. Lastly, the PIR should investigate the design of how the toe of the wall is tied into the bed.

Signed: \_\_\_\_\_  
Lynnette F. Schaper, P.E. CEPOH-EC-T

Signed: \_\_\_\_\_  
James Pennaz, P.E., Chief CEPOH-EC-T

Enclosure(s)

1. Site Plan